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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,966	12/10/2003	Hung Chih Chen	8402 USA/AGS/LAP	9309

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EXAMINER	
MACARTHUR, SYLVIA	
ART UNIT	**PAPER NUMBER**
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/732,966	CHEN ET AL.	
	Examiner	Art Unit	
	Sylvia R. MacArthur	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-9,11 and 13-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-9,11 and 13-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 October 2004* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/31/2007 has been entered.

Response to Arguments

Applicant's arguments with respect to claims 1-5,7-9,11 and 13-21have been considered but are moot in view of the new ground(s) of rejection as necessitated by the amendment of claims 1, 19, and 20 requiring that the outer diameter surface include a ledge and that the vertical sidewalls extend to substantially the same depth as the ledge.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-5, 7,8, 13, and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 2005/0113002) in view of Hosoki et al (US 6,280,306). The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This

rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claims 1 and 19: Chen et al teaches a retaining ring (300) comprising: a generally annular body having a top surface, a bottom surface, an inner diameter surface, and an outer diameter surface, wherein the bottom surface includes a plurality of channels (grooves 304), see Figs.3A-3F Each channel extends from the inner diameter surface to the outer diameter surface and having a curved section defining a rounded ceiling and substantially vertical side walls, wherein a distance between the sidewalls is constant from the bottom surface to the curved section and the sidewalls have a length that is greater than the depth of the curved section, see Fig. 3B –3F. See depictions of carrier heads in Figs. 1B and 1C.

Chen et al fails to teach a ledge as recited in the present invention.

The prior art of Hosoki et al teaches a wafer polishing apparatus with a retaining ring 27 and a ledge 30. The motivation to modify the retaining ring of Chen et al with a ledge is that it

helps to offset the pressure on the wafer thus decreasing damage due to excessive force on the wafer that often results with supporting the wafer during polishing see col. 10 lines 29-38. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a ledge on the retaining ring of Chen et al as taught by Hosoki et al.

Regarding claim 2: See Fig. 3B and [0062].

Regarding claim 3: Fig. 3Bepicts a semicircular cross-section has a diameter about equal to a width of the channel.

Regarding claims 4 and 5: See Fig. 3D-3F.

Regarding claims 7 , 8, and 18: Uniform depth as depicted in the Fig. 2A.

Regarding claim 13: The annular body comprises a wearable material see [0058].

Regarding claim 20: Chen et al teaches a method of polishing wherein there is relative motion between a substrate and a polishing surface, see [004] to [006] substituting the retaining rings having grooves through which polishing fluid is supplied as illustrated in Figs. 3B-3F.

Regarding claim 21: Section [0067] teaches a depth of 1-30 mm or 0.04 –1.2 in.

4. Claims 1-3, 7,8, 10-13, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glashauser (US 6,419,567) in view of Hosoki et al (US 6,280,306).

Regarding claims 1 and 19: Glashauser teaches a retaining ring (300) comprising: a generally annular body having a top surface, a bottom surface, an inner diameter surface, and an outer diameter surface, wherein the bottom surface includes a plurality of channels (grooves 350), see Fig. 8F Each channel extends from the inner diameter surface to the outer diameter surface and having a curved section defining a rounded ceiling and substantially vertical side

walls, wherein a distance between the sidewalls is constant from the bottom surface to the curved section and the sidewalls have a length that is greater than the depth of the curved section. See depictions of carrier heads in Fig. Fig.1A.

Glashauser fails to teach a ledge as recited in the present invention.

The prior art of Hosoki et al teaches a wafer polishing apparatus with a retaining ring 27 and a ledge 30. The motivation to modify the retaining ring of Glashauser with a ledge is that it helps to offset the pressure on the wafer thus decreasing damage due to excessive force on the wafer that often results with supporting the wafer during polishing see col. 10 lines 29-38. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a ledge on the retaining ring of Glashauser as taught by Hosoki et al.

Regarding claim 2: See Fig. 8. and col. 6 lines 18-20.

Regarding claims 3 and 7: Fig. 8 depicts a semicircular cross-section has a diameter about equal to a width of the channel and have uniform depth.

Regarding claims 8 and 18: Uniform depth as depicted in the Fig.10.

Regarding claims 10-12: See 1A and 8 the difference in heights of the sidewalls creates a ledge.

Regarding claim 13: The annular body comprises a plastic or ceramic as recited in col. 5 lines 24-30. It is the examiner's position that the material of construction is wearable due to the movement of the ring along the substrate and the expressed to prevent damage to the wafer while pressing against the pad, see col. 3 liens 54-60.

Regarding claim 20: Glashauser teaches a method of polishing wherein there is relative motion between a substrate and a polishing surface, see col.3 substituting the retaining rings having grooves through which polishing fluid is supplied as illustrated in Figs. 1A and 8

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al in view of Hosoki et al or Glashauser in view of Hosoki.

The teachings of Chen et al or Glashauser or Hosoki et al were discussed above. Chen et al or Glashauser fail to teach the angle relative to the radial segment as recited in claim 8 is between 30 and 60 degrees.

Regarding claim 9: Chen et al or Glashauser fails to teach the retaining ring of claim 8, wherein the angle is between 30 and 60 degrees.

The angle of orientation of the plurality of channels affects the uniformity and efficiency of flow of the slurry and serves to optimize the reduction of the accumulation of dried slurry in the grooves and thus reduces the micro scratches. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of cause effective variables such as the angle of orientation of the channels in the absence of a showing of criticality, see In re Woodruff, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the recesses of Chen et al or Glashauser at an angle range of 30 to 60 degrees in order to accommodate the force caused by polishing.

6. Claims 11, 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over (Glashauser or Chen et al) in view of Hosoki et al as applied above, and in further view of DeMeyer et al.

The teachings of (Glashauser or Chen et al) and Hosoki et al were discussed above.

Regarding clam 11: Both the combination of Glashauser et al or Chen et al with the prior art of Hosoki et al fail to teach the retaining ring of claim 10, wherein the outer diameter surface includes a first portion adjacent the bottom surface that has an outer diameter less than a second portion adjacent the top surface.

This occurs due to the ledge of DeMeyer et al. The motivation to provide a ledge is that the design ensures a threaded edge surface and an enhanced assembly surface for the CMP apparatus. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a ledge in the retaining ring of Glashauser et al or Chen et al with the prior art of Hosoki et al when modified by the teachings of DeMeyer et al.

Regarding claim 14: Both combinations fail to teach the retaining ring of claim 1, wherein the annular body comprises an upper portion and a lower portion, the upper portion being more rigid than the lower portion.

DeMeyer et al teaches a two-part retaining ring wherein the upper part is metal and the lower part is made of plastic. The motivation to modify the apparatus of Glashauser et al as modified with the ledge of Hosoki et al into a two piece construction is that the wearable plastic portion of the ring can be replaced without removing the top portion from the carrier head see [007] of DeMeyer et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the retaining ring of Glashauser or Chen et al with an upper portion and a lower portion and the ledge of Hosoki et al, the upper portion being more rigid than the lower portion as suggested by DeMeyer et al.

Regarding claim 15: The retaining ring of claim 14, recall the channels (grooves 350) of Glashauser are formed in the lower portion.

Regarding claim 16: Glashauser fails to teach the retaining ring of claim 15, wherein the lower portion is formed of a wearable material, only that the ring is made of plastic or ceramic in col.5 lines 24-28. Note the lower portion of DeMeyer et al is a wearable plastic. DeMeyer et al teaches a two-part retaining ring wherein the upper part is metal and the lower part is made of plastic. The motivation to modify the apparatus of Hiroshi into a two piece construction is that the wearable plastic portion of the ring can be replaced without removing the top portion from the carrier head see [007] of DeMeyer et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the retaining ring of Hiroshi with an upper portion and a lower portion, the upper portion being more rigid than the lower portion as suggested by DeMeyer et al.

Regarding clam 17: The retaining ring of claim 15, further comprising a plurality of passages extending through the upper portion from the inner diameter surface to the outer diameter, see the channels of Glashauser, see Figs. 1A and 8.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-Th during the hours of 8 a.m. and 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sylvia R MacArthur
Primary Examiner
Art Unit 1792

January 7, 2008